

Geo 5.5b

CYLINDER VOLUME

You will need 2 each of the following sizes of paper:

- 1) $8\frac{1}{2} \times 11$, 2) 8×9 , 3) $6\frac{1}{2} \times 10$, 4) 4×11 .

Take two identical sheets of paper. Roll one sheet into a short cylinder and the other into a tall cylinder. Set them both on a flat surface. Do you think one of the cylinders holds more than the other? Make a conjecture below about the volumes of the two cylinders.

Now prove or disprove your conjecture by pouring rice, popcorn, beans, etc. into your cylinders to see which has the greatest volume. Repeat using different sized paper. Then calculate and record below the volumes of each cylinder to further prove or disprove your conjecture. Carefully compare the differences in each measurement.

<i>rectangle</i>	<i>height</i>	<i>circumference</i>	<i>radius</i>	<i>base area</i>	<i>Volume</i>
<i>1a</i>					
<i>1b</i>					
<i>difference</i>					
<i>2a</i>					
<i>2b</i>					
<i>difference</i>					
<i>3a</i>					
<i>3b</i>					
<i>difference</i>					
<i>4a</i>					
<i>4b</i>					
<i>difference</i>					
<i>5a</i>					
<i>5b</i>					
<i>difference</i>					

Does the data support your conjecture? Do you notice anything now that you might have over-looked before?

How has this activity helped you to understand volumes of cylinders better?

Extension:

- 1) Take an 8" x 11" piece of paper and make a cylinder with a height of 8" and a circumference of 11". Find the volume. $V = \underline{\hspace{2cm}}$
- 2) Cut the height of the cylinder in half and double the circumference. You will create a cylinder with a 4" height and a 22" circumference. Find the volume. $V = \underline{\hspace{2cm}}$
- 3) Cut the height of the cylinder from problem 2 in half and double the circumference. Find the volume. $V = \underline{\hspace{2cm}}$
- 4) Cut the height of the cylinder from problem 3 in half and double the circumference. Find the volume. $V = \underline{\hspace{2cm}}$
- 5) Look at the volumes of the cylinders in problems 1-4, explain what is happening to the volume of the cylinders.

Make a conjecture about what happens when you decrease the height of a cylinder by half and double its circumference.

- 6) Prove or disprove your conjecture algebraically.

Will you Be Wet or Dry?

- 1) Choose two different sizes of cans to use for this activity. Measure the diameter and the height of each can.

Can 1: Diameter _____ Height _____

Can 2: Diameter _____ Height _____

- 2) As a group determine the volume of each can. Show your work below or explain how you found the volume of your cans. Make sure that your units are correct. (Hint: One cubic centimeter is the same as one millimeter.)

Can 1

Can 2

- 3) Select one of your cans and bring it up to the teacher with your calculation for the volume of the can. Also, select one member of the team to test your calculations. This will be done by having your teacher fill your can with water over this team member's head. (Remember, if you calculate too high, the water will overflow onto your head and if your calculations are too low, then all the water will get dumped on your head.)

Which can did your team choose and why did you choose this can?

How close were your calculations to the actual volume of the can?

What would you do differently if you could recalculate the volume of your can?